



Electrical code issues and answers.

● Swimming Pool, Spa, and Hot Tub Equipment Disconnects

The 1999 NEC 680-12 now requires that “A disconnecting means *shall be provided and be accessible, located within sight from all pools, spas, and hot tub equipment, and shall be located at least 5 ft (1.52 m) from the inside walls of the pool, spa, or hot tub.*”

NEC 680-12 is not specific as to what is to be disconnected. A review of the NFPA Report on Proposals (ROP) indicates that the intent was to disconnect all equipment associated with pools, spas, and hot tubs. Additional review of the 1996 ROP, a conversation with the Chairman of Code Panel number 20, and review of the comments in the 1999 NEC Handbook makes it clear that the disconnecting means is intended to be installed within sight of the equipment. This would include all pumping, heating, lighting, and other associated equipment such as pool cover motors. Simultaneous disconnection of all equipment is not required. Multiple disconnects can be used.

A new code section NEC 680-38 for spas and hot tubs has been added and requires that “A clearly labeled emergency shutoff or control switch for the purpose of stopping the motor(s) that provide power to the recirculation system and jet system shall be installed readily accessible to the users and at least 5 ft (1.52m) away, adjacent to, and within sight of the spa or hot tub. This requirement shall not apply to single-family dwellings.”

NEC 680-38 requires an emergency shutoff for recirculating and jet system motors(s) that is readily accessible to the users. In some cases, this could be accomplished with the disconnecting means required by NEC 680-12, provided that the disconnecting means is within sight of both the equipment and the spa or hot tub. The emergency shutoff is intended to provide an additional level of safety by providing a means to disconnect power should anyone be trapped in a suction opening. The requirement for the emergency switch could be accomplished by installing a clearly labeled shunt trip or “panic” button in the control circuit that would disconnect power to recirculation and jet system motors.

The emergency switch for spas and hot tubs required by NEC 680-38 must be clearly labeled. The department has determined that to be clearly labeled this switch must be substantially red in color and identified with a sign/label as the emergency disconnecting means. This determination is consistent with other identification requirements found in the WAC for emergency disconnection means.

● Proper Identification and Use of Tamper-resistant Receptacles

Questions have been raised regarding the proper use of tamper resistant receptacles. WAC 296-46-21052 says, “*Tamper resistant receptacles are required in licensed day care facilities and pediatric or psychiatric patient care areas for 15 or 20 ampere, 125 volt receptacles. Tamper resistant receptacles shall, by construction, limit improper access to energized contacts.*” Information about tamper resistant receptacles can be found in UL’s General Information for Electrical Equipment (white book, page 73).

The letters “TR” must be affixed by the manufacturer to the receptacle and visible after installation when the device cover is removed. Tamper resistant receptacles may be of the general, hospital, or isolated ground type. Standard GFCI receptacles are not considered to be tamper proof unless they bear the “TR” designation.

● Inspection Requirements for Elevator Room Branch Circuits

The 1999 NEC 620-22 has changed to require the branch circuit overcurrent devices to be located in the elevator machine room/machinery space for the car lights, receptacle(s), auxiliary lighting power source, air-conditioning, and ventilation for each elevator car. The disconnecting means for these overcurrent devices must be capable of being locked in the open position and meet all the requirements of NEC 620-53 & 54. The car light source, HVAC source, machine room lighting/receptacle(s), and hoistway pit lighting/receptacle(s) must be supplied by separate dedicated branch circuits.

A revision to Electrical Inspection Policy 98-12 became effective January 11, 1999 regarding the scope of work for Labor and Industries Electrical/Elevator Inspectors. Electrical inspectors will inspect the installation of the disconnect, shunt trip, and feeder up to the conveyance controller and other miscellaneous electrical wiring within

the machine room, including but not limited to lights, receptacles, sump pumps, smoke, and heat detectors installed by the electrical contractor. In elevator installations where a shunt trip is required, the disconnect will not be approved until after the shunt trip is installed. **Elevator Inspectors** will inspect for proper operation of the disconnect, shunt trip device and all other work related to conveyance installation/alteration permits, including, but not limited to, all electrical, mechanical, and hydraulic systems in elevator machine rooms, hoistway, pit, cab, lobby, and top of car. The electrical, elevator, and safety coordinators must work together to ensure a safe installation and inspection.

● **Aluminum Conduit – In Concrete, Direct Buried, or Corrosive Environment**

Can rigid aluminum conduit be installed underground to a septic wet well? Review of the UL White Book "Guide Card" Rigid Nonferrous Metal Conduit (DYWV), indicates Aluminum conduit used in concrete or in contact with soil requires supplementary corrosion protection. The White Book says, "Aluminum conduit used in concrete or in contact with soil requires supplementary corrosion protection. Supplementary non-metallic coatings as part of the conduit have not been investigated for resistance to corrosion."

NEC 300-6(b) also requires supplementary corrosion protection for all non-ferrous metal raceways installed in concrete or in direct contact with the earth. Because supplementary corrosion protection for aluminum conduit is not evaluated under any standard, aluminum conduit installed in concrete, direct contact with the earth or other corrosive environments is not allowed.

● **Wet Location Splices in Well Heads, Septic Tanks, and Open Bottom Handholes**

Well heads and septic tanks are wet locations and require splices that are suitable for wet locations. Splices made in open bottom handholes/boxes are required to be suitable for direct burial. If the handhole/box is manufactured specifically for electrical use, splices approved for wet locations will be permitted under the following conditions in WAC 296-46-370:

(1) The box shall be rated for not less than H-10 loading (8000 pounds over a 10" x 10" area) and be provided with a bolted, hinged, or slide-on lid embossed with the identification "ELECTRIC" or "ELECTRICAL." Metal covers shall be grounded per NEC Article 250.

(2) All conductors must be installed in approved electrical raceways which enter vertically from the open bottom of the enclosure. These raceways shall be fitted with a bushing, terminal fitting, or seal incorporating the physical protection characteristics of a bushing, and project not less than 2 inches (5 cm) above the bottom surface material. The bottom surface material shall be pea gravel, sand, or concrete.

It is important to remember that wire and splices in an open bottom handhole/box are considered to be direct burial requiring direct burial cable and splices unless it meets the requirements of (1) and (2) above that would allow wet location wire and splices. It should be noted that standard wire nuts are not approved for wet locations.

● **Clarification of June 1999 Conduit to Outdoor Hot Tubs and Spas**

The June 1999 Currents article relating to wiring methods for outdoor hot tubs and spas requires further explanation to clear up some confusion it may have caused.

NEC 680-40 requires that outdoor spas and hot tubs comply with the provisions of Part A and B of Article 680. Part A of NEC 680 applies to all pools, outdoor spas, and outdoor hot tubs. Part B, however, applies only to pools, outdoor spas, and outdoor hot tubs that are permanently installed.

NEC 680-4 defines permanently installed swimming, wading, or therapeutic pool as: *Those that are constructed in the ground or partially in the ground, and all others capable of holding water in a depth greater than 42 in. (1.07m).* This definition would not include most packaged spas or hot tubs that are set on a slab or patio since they are not in the ground and are typically shallower than 42 inches.

Further clarification is needed as to the wiring methods related to feeders that supply a panelboard installed at a separate building for pools, spas, and hot tubs. The main text of NEC 680-25 (d) requires that the feeder conductors and an insulated equipment grounding conductor shall be installed in rigid metal conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or rigid non metallic conduit and allows the use of EMT where installed on or in the building. NEC 680-25 (d) (2) allows: "A panelboard at a separate building shall be permitted to supply swimming pool equipment if the feeder meets the requirements for grounding in Section 250-32." Subsection (d)(2) may allow the feeder to be regrounded at the separate building thus eliminating the need for the insulated equipment grounding conductor but does not exclude the requirement that the feeder conductors are installed in conduit. When the neutral conductor of the feeder is used to ground the panelboard at the separate building it is as equally important to protect the neutral as it is to protect a separate equipment grounding conductor.